



National Transportation Safety Board Aviation Accident Final Report

Location:	Salcha, AK	Accident Number:	ANC17FA026
Date & Time:	05/27/2017, 1122 AKD	Registration:	N57AT
Aircraft:	ARCTIC AIRCRAFT CO INC S 1B2	Aircraft Damage:	Substantial
Defining Event:	Loss of control in flight	Injuries:	2 Fatal
Flight Conducted Under:	Part 91: General Aviation - Personal		

Analysis

The pilot and passenger were searching for an overdue boat with the intent of landing at a remote unimproved airstrip located near the boat's intended destination. A witness reported strong wind conditions as she observed the airplane circle the airstrip. While the airplane was circling, its nose suddenly dropped, and the airplane descended in a near-vertical attitude to ground impact. She stated that the engine continued to run, and the airplane did not make any unusual sounds, other than an increase in engine rpm, during the descent.

A postaccident examination of the airframe and engine revealed no evidence of mechanical malfunctions or failures that would have precluded normal operation. The observed damage to the airplane indicated that it impacted the ground in a nose-down, near-vertical attitude. The witness account and the damage to the airplane were consistent with the pilot failing to maintain sufficient airspeed while maneuvering, which resulted in the airplane's wing exceeding its critical angle of attack and a subsequent aerodynamic stall.

The airplane's estimated gross weight at the time of the accident was about 130.5 pounds over its approved maximum gross weight of 1,650 pounds, and the airplane's estimated center of gravity was about 0.1 inches beyond the approved aft limit at gross weight. As excessive weight increases stall speed and an aft center of gravity decreases controllability, it is likely that the pilot's decision to operate the airplane over gross weight with an aft center of gravity contributed to the loss of control.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be:

The pilot's failure to maintain adequate airspeed while maneuvering in high winds, which resulted in the airplane exceeding its critical angle of attack and an aerodynamic stall. Contributing to the accident was the pilot's improper decision to load the airplane beyond its allowable gross weight and center of gravity limits.

Findings

Aircraft	Airspeed - Not attained/maintained (Cause) Angle of attack - Not attained/maintained (Cause) Maximum weight - Capability exceeded (Factor) CG/weight distribution - Capability exceeded (Factor)
Personnel issues	Aircraft control - Pilot (Cause) Decision making/judgment - Pilot (Factor)
Environmental issues	High wind - Effect on operation (Cause) Gusts - Effect on operation

Factual Information

HISTORY OF FLIGHT

On May 27, 2017, about 1122 Alaska daylight time, an Arctic Aircraft Company S-1B2 airplane, N57AT, impacted terrain following a loss of control, about 35 miles east of Salcha, Alaska. The private pilot and the passenger sustained fatal injuries, and the airplane was substantially damaged. The airplane was registered to Brice Consulting LLC and operated by the pilot as a 14 *Code of Federal Regulations* Part 91 personal flight. Visual meteorological conditions prevailed, and no flight plan had been filed. The flight departed from an off-airport landing site near Fairbanks, Alaska, about 0925.

According to a family member of the pilot, the purpose of the flight was to search for an overdue boat that was piloted by a family member of the passenger with the intent of landing at a remote unimproved airstrip located near the boat's destination. The boat had left the previous evening for a recreational cabin located along the Salcha River.

During a telephone conversation with the National Transportation Safety Board (NTSB) investigator-in-charge (IIC) on June 1, 2017, a witness reported that she observed the airplane circle the remote unimproved airstrip along the Salcha River. While the airplane was circling, its nose suddenly dropped, and the airplane descended in a near-vertical attitude. She stated that the engine continued to run, and the airplane did not make any unusual sounds, other than an increase in engine rpm, during the descent. The witness reported strong wind conditions prevailed at the time of the accident.

PERSONNEL INFORMATION

The pilot, age 81, held a private pilot certificate with an airplane single-engine land rating. His most recent third-class medical was issued on September 30, 2015, with the limitation that he must wear corrective lenses.

Personal flight records were located for the pilot; however, they were not complete. The aeronautical experience listed in this report was obtained from a review of the Federal Aviation Administration (FAA) records for the pilot on file in the Airman and Medical Records Center located in Oklahoma City. The pilot did not report flight experience on his most current application for a medical certificate dated, September 3, 2015. However, on his application for a prior medical certificate, dated August 7, 2013, he indicated that his total aeronautical experience was about 1,960 hours of which 60 hours were in the previous 6 months.

AIRCRAFT INFORMATION

At the time of the accident, the 1978 model year airplane had a total time in service of 3,087.50 flight hours. A review of the maintenance records revealed that the most recent annual inspection of the airframe and engine was completed 27.10 flight hours before the accident on June 9, 2016.

The airplane was equipped with a 160-horsepower Lycoming O-320 B2B engine. At the time of the accident, the engine had accumulated 1,748.00 hours since overhaul.

METEOROLOGICAL INFORMATION

The closest official weather observation station to the accident site was Eielson Air Force Base, Fairbanks, Alaska, located about 35 miles east of the accident site. At 1058, Eielson was reporting, in part, wind calm; visibility 10 statute miles; clouds and ceiling 10,000 ft broken; temperature 52°F; dew point 27°F; and altimeter 30.04 inches of mercury.

WRECKAGE AND IMPACT INFORMATION

The wreckage was located in an area of black spruce trees and tundra-covered terrain at an elevation about 1,000 ft mean sea level. The on-scene examination revealed that the airplane impacted in a near-vertical attitude, and the nose of the airplane was on about a 110° magnetic heading.

All of the airplane's major components were found at the main wreckage site. The cockpit area was extensively damaged. The engine, firewall, and instrument panel were displaced upward and aft. The mixture control was found in the full-forward position, and the carburetor heat was in the off position.

The airplane's right wing remained attached to the fuselage. About 2 feet of the outboard portion of the right wing exhibited extensive leading edge aft crushing. The airplane's left wing separated from the fuselage at its rear attach point but remained attached at its forward attach point.

The left and right flaps remained attached to their respective attach points. The inboard portion of the right flap was crushed against the side of the fuselage and bent about 20° down. The left flap was relatively free of impact damage.

The horizontal and vertical stabilizer, elevators, and rudder remained attached to the empennage and were free of impact damage.

All the primary flight control surfaces were identified at the accident site, and flight control continuity was verified from the cockpit to the elevators and rudder. Aileron control continuity was established in the direct cables from the cockpit to the right aileron and from the cockpit through the point where the cable's turnbuckle was disassembled for recovery to the left aileron. In addition, aileron control continuity was established in the balance cable from the right and left ailerons to the point where the cable fractured with features consistent with tension overload.

The engine sustained impact damage to the front and underside. An examination of the engine did not reveal any anomalies, contamination, or evidence of malfunction in any of the engine accessories. Examination of the cylinders, pistons, valve train, crankshaft, and other internal components revealed no evidence of an anomaly or malfunction that would have precluded normal operation. Both magnetos were removed from the engine, and their couplings were

rotated by hand. When each coupling was rotated, blue spark was observed at the distributor in rotational order.

The propeller remained attached to the engine crankshaft by 2 of the 6 attach bolts. One propeller blade exhibited substantial torsional "S" twisting and light chordwise scratching. The other propeller blade exhibited light chordwise scratching and aft bending about 3 inches from the tip.

The examination of the airframe and engine revealed no evidence of mechanical malfunctions or failures that would have precluded normal operation.

MEDICAL AND PATHOLOGICAL INFORMATION

The Alaska State Medical Examiner, Anchorage, Alaska, conducted an autopsy of the pilot on May 30, 2017. The cause of death was attributed to multiple blunt force injuries.

The FAA's Bioaeronautical Sciences Research Laboratory, Oklahoma City, Oklahoma, performed toxicology testing on specimens from the pilot. The testing was negative for carbon monoxide and alcohol. The testing revealed unspecified levels of verapamil in the blood and liver and its active metabolite, norverapamil, in the blood. Verapamil is a prescription calcium channel blocker used to treat high blood pressure, angina, and arrhythmias.

TESTS AND RESEARCH

At the time of the accident, the pilot was using a Garmin Aera series portable global positioning system (GPS) receiver capable of storing route-of-flight data. The unit was sent to the NTSB's Alaska Regional Headquarters and data for the accident flight, which included, in part, time, latitude, longitude, and GPS altitude were extracted. Groundspeed and course information were derived from the extracted parameters.

The GPS data logs for May 27, 2017, revealed that the flight departed the remote off-airport landing site about 0925:30. After departure, the airplane proceeded southeast along the Tanana River before it turned east and proceeded up the Salcha River. The last fully recorded GPS data point was at 1122:39 when the airplane was at 1,705 ft (GPS derived altitude), heading 132° (true), and 47 knots ground speed.

A flight track map overlay and tabular data corresponding to the accident flight are available in the public docket for this accident.

ADDITIONAL INFORMATION

Estimated Weight and Balance

An estimate of the airplane's weight and balance at the time of the accident was calculated based on the following information.

The pilot's weight was taken from his most current FAA medical examination. The weight of the rear seat passenger was taken from his Alaska state driver's license.

In a telephone conversation with the NTSB IIC on July 26, 2017, the Alaska State Troopers who recovered two backpacks from the accident site estimated their total weight at 25 pounds, or about 12.5 pounds each.

During a conversation with the IIC, a family member of the pilot reported that fuel was not available at the remote landing site along the Salcha River. The fuel onboard at the time of the accident was estimated by calculating the amount of fuel required for the estimated 45-minute direct return flight from the accident site to the originating airstrip plus the required 30-minute reserve. Using an average fuel burn rate of 8 gallons per hour, the quantity of fuel in the airplane at the time of the accident was estimated to be 10 gallons.

A friend of the pilot provided the NTSB IIC with a list of items that were onboard the airplane at the time of the accident. Exemplar items were weighed, and those weights were used to compute the weight and balance.

The last documented weight and balance information located for the airplane was dated May 29, 2015. At that time, the basic empty weight of the airplane on wheels was 1,274.50 pounds with a center of gravity of 11.53 inches.

Basic Empty Weight– 1,274.50 pounds

Pilot– 184 pounds

Rear Seat Passenger – 170 pounds

24 pack water – 27 pounds

6 bottles wine – 17 pounds

Frying pan – 0.5 pounds

8 pack paper towels – 4 pounds

3 patio pillows – 3.5 pounds

2 backpacks – 25 pounds

Fuel (10 gallons) – 60 pounds

Oil (8 quarts) – 15 pounds

Using the values listed above, the gross weight of the airplane at the time of the accident was estimated to be 1,780.5 pounds, which was 130.5 pounds over the approved maximum takeoff gross weight for the airplane of 1,650 pounds. The estimated center of gravity at the time of the accident was 15.896 inches. The center of gravity range at 1,650 pounds (maximum gross weight) was 11.0 inches to 15.8 inches.

History of Flight

Maneuvering-low-alt flying	Loss of control in flight (Defining event) Collision with terr/obj (non-CFIT)
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Pilot Information

Certificate:	Private	Age:	81, Male
Airplane Rating(s):	Single-engine Land	Seat Occupied:	Front
Other Aircraft Rating(s):	None	Restraint Used:	3-point
Instrument Rating(s):	None	Second Pilot Present:	No
Instructor Rating(s):	None	Toxicology Performed:	Yes
Medical Certification:	Class 3 With Waivers/Limitations	Last FAA Medical Exam:	09/30/2015
Occupational Pilot:	No	Last Flight Review or Equivalent:	
Flight Time:	1960 hours (Total, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	ARCTIC AIRCRAFT CO INC	Registration:	N57AT
Model/Series:	S 1B2	Aircraft Category:	Airplane
Year of Manufacture:	1978	Amateur Built:	No
Airworthiness Certificate:	Normal	Serial Number:	1008
Landing Gear Type:	Tailwheel	Seats:	2
Date/Type of Last Inspection:	06/09/2016, Annual	Certified Max Gross Wt.:	1650 lbs
Time Since Last Inspection:	27 Hours	Engines:	1 Reciprocating
Airframe Total Time:	3087.5 Hours at time of accident	Engine Manufacturer:	Lycoming
ELT:	C91 installed, not activated	Engine Model/Series:	O-320 B2B
Registered Owner:	On file	Rated Power:	160 hp
Operator:	On file	Operating Certificate(s) Held:	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	PAEI	Distance from Accident Site:	35 Nautical Miles
Observation Time:	1858 UTC	Direction from Accident Site:	80°
Lowest Cloud Condition:		Visibility	10 Miles
Lowest Ceiling:	Broken / 10000 ft agl	Visibility (RVR):	
Wind Speed/Gusts:	Calm /	Turbulence Type Forecast/Actual:	/
Wind Direction:		Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	30.04 inches Hg	Temperature/Dew Point:	11 °C / -3 °C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Fairbanks, AK	Type of Flight Plan Filed:	None
Destination:	Salcha, AK	Type of Clearance:	None
Departure Time:	1000 AKD	Type of Airspace:	Class G

Wreckage and Impact Information

Crew Injuries:	1 Fatal	Aircraft Damage:	Substantial
Passenger Injuries:	1 Fatal	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	2 Fatal	Latitude, Longitude:	64.647500, -145.878611 (est)

Administrative Information

Investigator In Charge (IIC):	David B Banning	Report Date:	02/12/2018
Additional Participating Persons:	Dustin Hopkins; Federal Aviation Administration; Fairbanks, AK		
Publish Date:	02/12/2018		
Note:	The NTSB traveled to the scene of this accident.		
Investigation Docket:	http://dms.nts.gov/pubdms/search/dockList.cfm?mKey=95243		

The National Transportation Safety Board (NTSB), established in 1967, is an independent federal agency mandated by Congress through the Independent Safety Board Act of 1974 to investigate transportation accidents, determine the probable causes of the accidents, issue safety recommendations, study transportation safety issues, and evaluate the safety effectiveness of government agencies involved in transportation. The NTSB makes public its actions and decisions through accident reports, safety studies, special investigation reports, safety recommendations, and statistical reviews.

The Independent Safety Board Act, as codified at 49 U.S.C. Section 1154(b), precludes the admission into evidence or use of any part of an NTSB report related to an incident or accident in a civil action for damages resulting from a matter mentioned in the report. A factual report that may be admissible under 49 U.S.C. § 1154(b) is available [here](#).